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Anexo A Presupuesto

A continuación se exponen los costes materiales, de caracterización y de mano de obra directa (M.O.D.), representados en la *tabla 18*, *tabla 19* y *tabla 20*, respectivamente.

Los valores, todo y que son aproximados, son válidos de cara a tener una idea del presupuesto necesario para este tipo de estudios.

A.1 Coste material del proyecto

COSTE MATERIAL DEL PROYECTO

PRODUCTO (*)	UDS.	PRECIO/UD. (€)	TOTAL (€)	TOTAL + I.V.A. (16%)
CAB-O-PERSE® GP32/17	1	6,25	6,25	7,25
HIDROXIAPATITA (MERK)	1	93,16	93,16	108,07
MORTERO	1	3260,73	3260,73	3782,45
MOLINO FRITSCH (PULVERISETTE)	1	4500	4500	5220,00
BOLAS DE ÁGATA 30mm. ø (PULVERISETTE)	4	66,33	265,32	307,77
BOLAS DE ÁGATA 10mm. ø (PULVERISETTE)	8	8,44	67,52	78,32
TOTAL (€)				**9503,86**

(*) PRODUCTOS MÁS UTILIZADOS

Tabla 18: tabla representativa del coste material del proyecto.

A.2 Coste de la caracterización

COSTE DE LA CARACTERIZACIÓN

CONCEPTO	Nº MUESTRAS	Nº HORAS	PRECIO/MUESTRA	PRECIO/HORA	TOTAL	TOTAL + I.V.A. (16%)
XRD	40	40		27,67	1106,8	1283,89
TEM		4	20,12		80,48	93,36
SEM		2	16,53		33,06	38,35
BET	1		26,15		26,15	30,33
INFRARROJOS	3		32,13		96,39	111,81
TOTAL (€)						**1557,74**

Tabla 19: tabla representativa del coste de la caracterización de los resultados obtenidos.

A.3 Coste de la mano de obra directa

MANO DE OBRA DIRECTA EN EL PROYECTO

CONCEPTO	HORAS	PRECIO/HORA	TOTAL (€)	TOTAL + I.V.A. (16%)
TIEMPO LABORATORIO	400	24	9600	11136,00
TEM	4	24	96	111,36
SEM	2	24	48	55,68
DSC	20	24	480	556,80
TOTAL (€)				**11859,84**

Tabla 20: Tabla representativa de la mano de obra utilizada en la realización del proyecto.

Anexo B Patrones de la JCPDS-ICDD (Internacional Centre for Diffraction Data)

B.1 Patrón del alfa-TCP

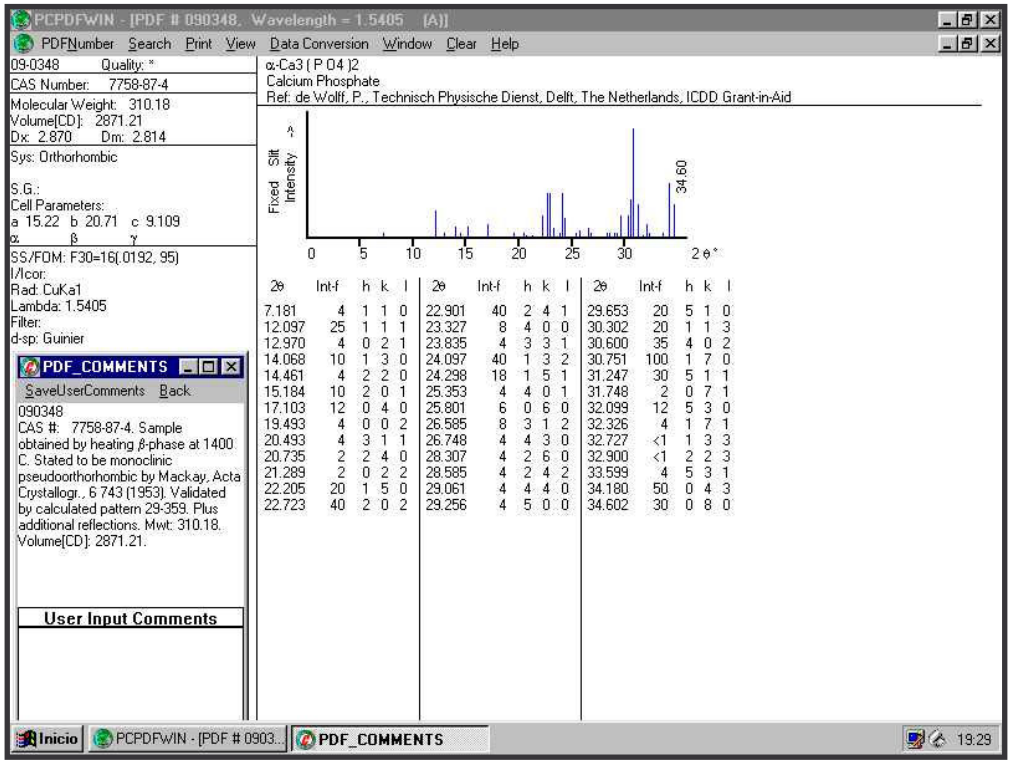
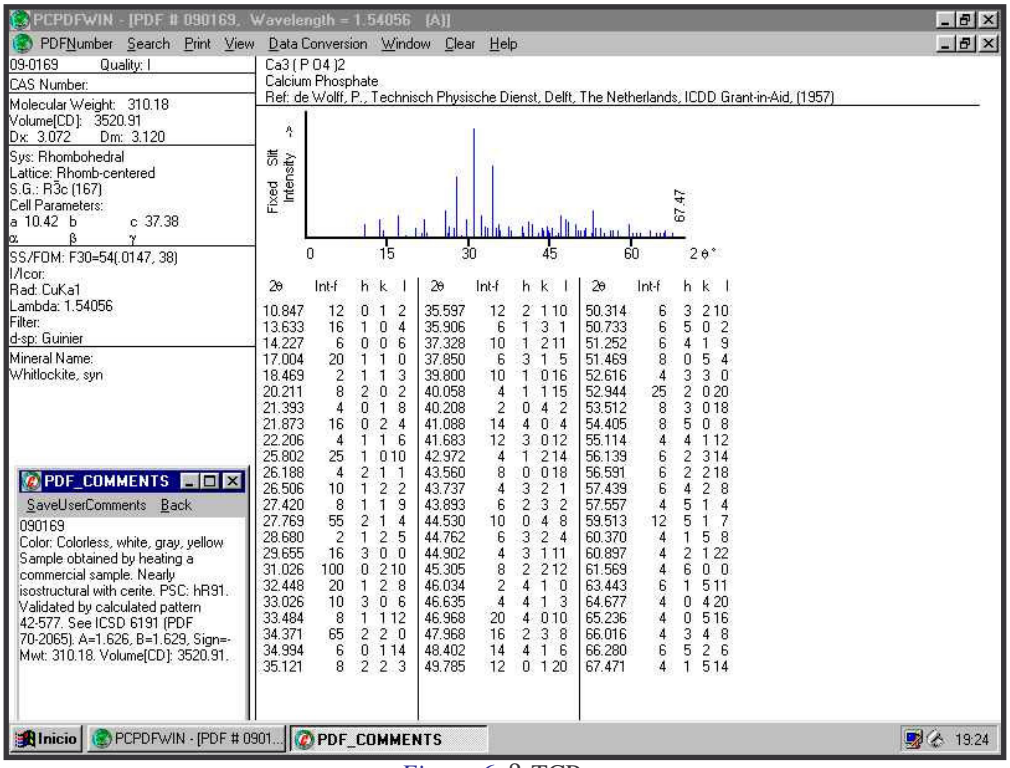


Figura 5: α-TCP

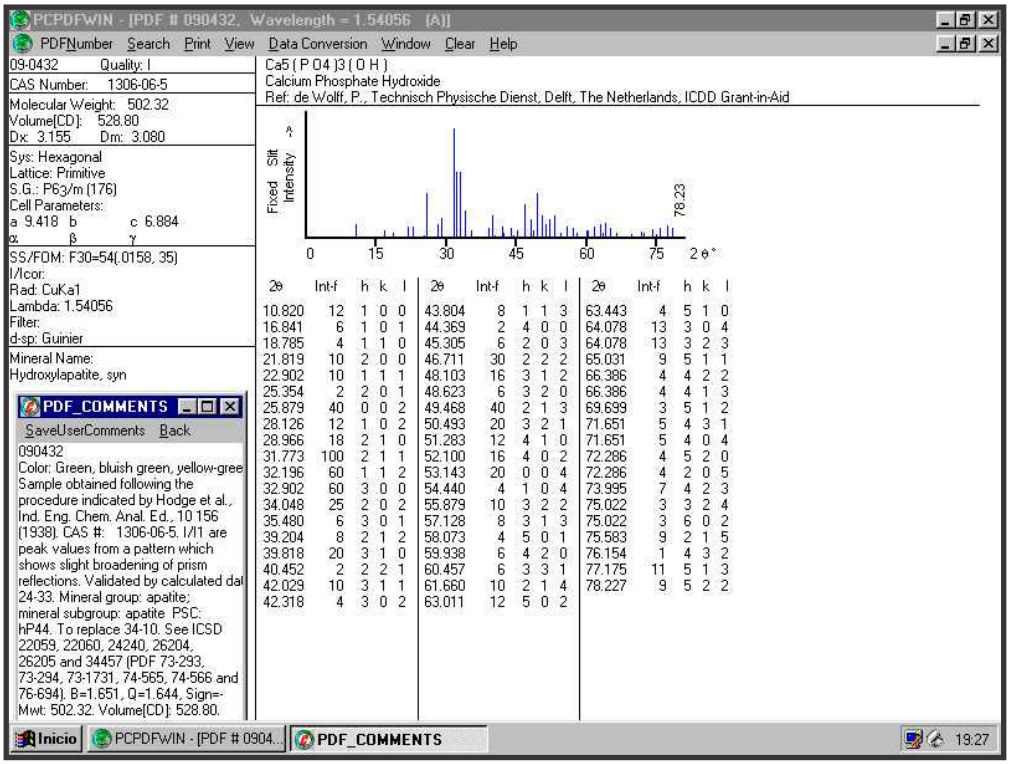
B.2 Patrón del beta-TCP



2θ	Int-f	h	k	l	2θ	Int-f	h	k	l	2θ	Int-f	h	k	l
10.847	12	0	1	2	35.597	12	2	1	10	50.314	6	3	2	10
13.633	16	1	0	4	35.906	6	1	3	1	50.733	6	5	0	2
14.227	6	0	0	6	37.328	10	1	2	11	51.252	6	4	1	9
17.004	20	1	1	0	37.850	6	3	1	5	51.469	8	0	5	4
18.469	2	1	1	3	39.800	10	1	0	16	52.616	4	3	3	0
20.211	8	2	0	2	40.058	4	1	1	15	52.944	25	2	0	20
21.393	4	0	1	8	40.208	2	0	4	2	53.512	8	3	0	18
21.873	16	0	2	4	41.088	14	4	0	4	54.405	8	5	0	8
22.206	4	1	1	6	41.683	12	3	0	12	55.114	4	4	1	12
25.802	25	1	0	10	42.972	4	1	2	14	56.139	6	2	3	14
26.188	4	2	1	1	43.560	8	0	0	18	56.591	6	2	2	18
26.506	10	1	2	2	43.737	4	3	2	1	57.439	6	4	2	8
27.420	8	1	1	9	43.893	6	2	3	2	57.557	4	5	1	4
27.769	55	2	1	4	44.530	10	0	4	8	59.513	12	5	1	7
28.680	2	1	2	5	44.762	6	3	2	4	60.370	4	1	5	8
29.655	16	3	0	0	44.902	4	3	1	11	60.897	4	2	1	22
31.026	100	0	2	10	45.305	8	2	2	12	61.569	4	6	0	0
32.448	20	1	2	8	46.034	2	4	1	0	63.443	6	1	5	11
33.026	10	3	0	6	46.635	4	4	1	3	64.677	4	0	4	20
33.484	8	1	1	12	46.968	20	4	0	10	65.236	4	0	5	16
34.371	65	2	2	0	47.968	16	2	3	8	66.016	4	3	4	8
34.994	6	0	1	14	48.402	14	4	1	6	66.280	6	5	2	6
35.121	8	2	2	3	49.785	12	0	1	20	67.471	4	1	5	14

Figura 6: β-TCP

B.3 Patrón de la HA



2θ	Int-f	h	k	l	2θ	Int-f	h	k	l	2θ	Int-f	h	k	l
10.820	12	1	0	0	43.804	8	1	1	3	63.443	4	5	1	0
16.841	6	1	0	1	44.369	2	4	0	0	64.078	13	3	0	4
18.785	4	1	1	0	45.305	6	2	0	3	64.078	13	3	2	3
21.819	10	2	0	0	46.711	30	2	2	2	65.031	9	5	1	1
22.902	10	1	1	1	48.103	16	3	1	2	66.386	4	4	2	2
25.354	2	2	0	1	48.623	6	3	2	0	66.386	4	4	1	3
25.879	40	0	0	2	49.468	40	2	1	3	69.699	3	5	1	2
28.126	12	1	0	2	50.493	20	3	2	1	71.651	5	4	3	1
28.966	18	2	1	0	51.283	12	4	1	0	71.651	5	4	0	4
31.773	100	2	1	1	52.100	16	4	0	2	72.286	4	5	2	0
32.196	60	1	1	2	53.143	20	0	0	4	72.286	4	2	0	5
32.902	60	3	0	0	54.440	4	1	0	4	73.995	7	4	2	3
34.048	25	2	0	2	55.879	10	3	2	2	75.022	3	3	2	4
35.480	6	3	0	1	57.128	8	3	1	3	75.022	3	6	0	2
39.204	8	2	1	2	58.073	4	5	0	1	75.583	9	2	1	5
39.818	20	3	1	0	59.938	6	4	2	0	76.154	1	4	3	2
40.452	2	2	2	1	60.457	6	3	3	1	77.175	11	5	1	3
42.029	10	3	1	1	61.660	10	2	1	4	78.227	9	5	2	2
42.318	4	3	0	2	63.011	12	5	0	2					

Figura 7: HA

B.4 Patrón del SiO_2

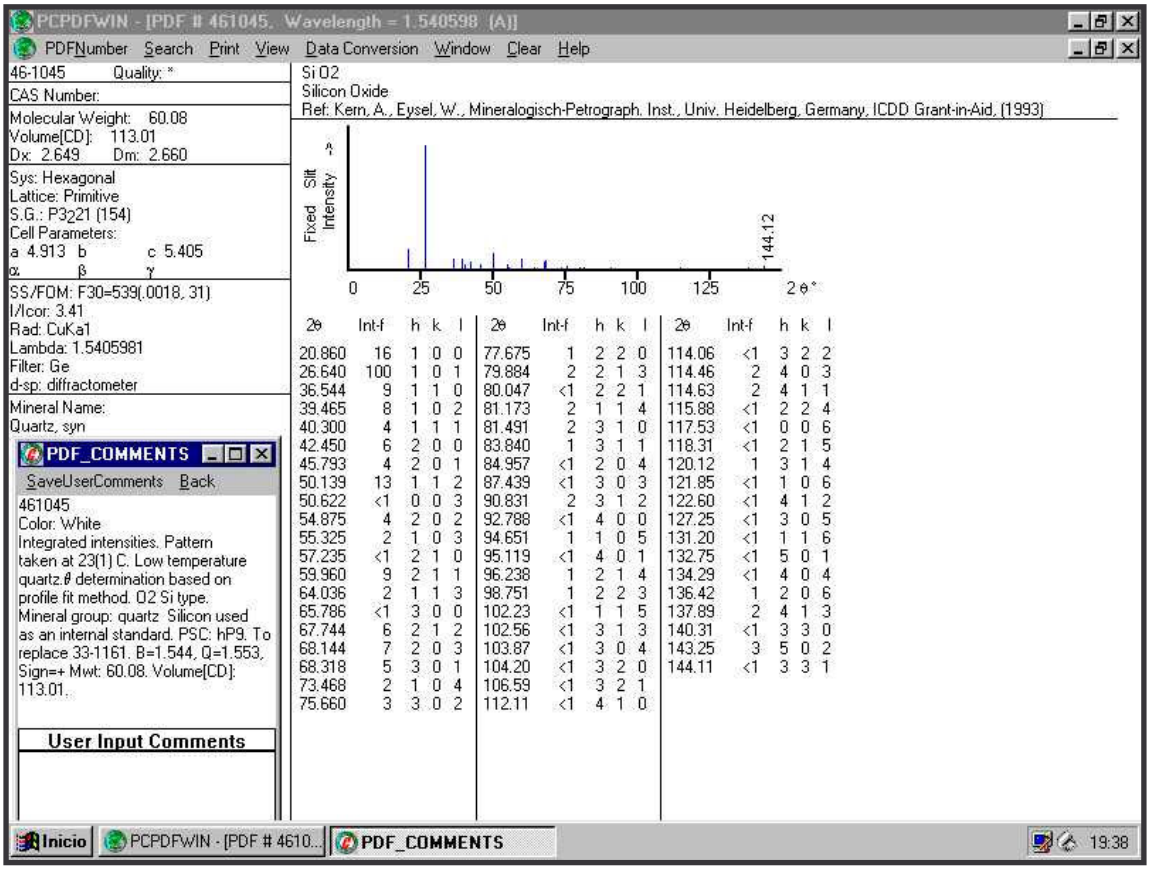
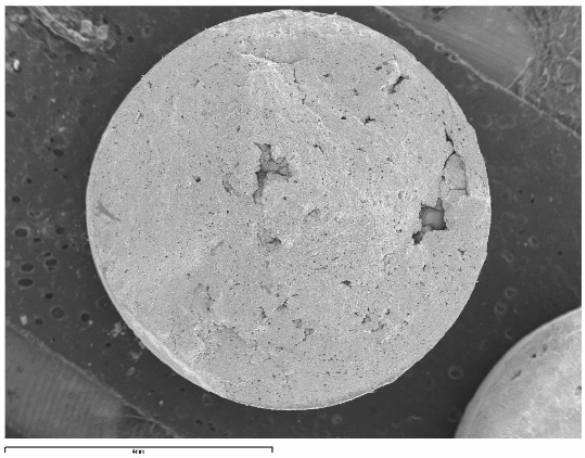


Figura 8: SiO_2

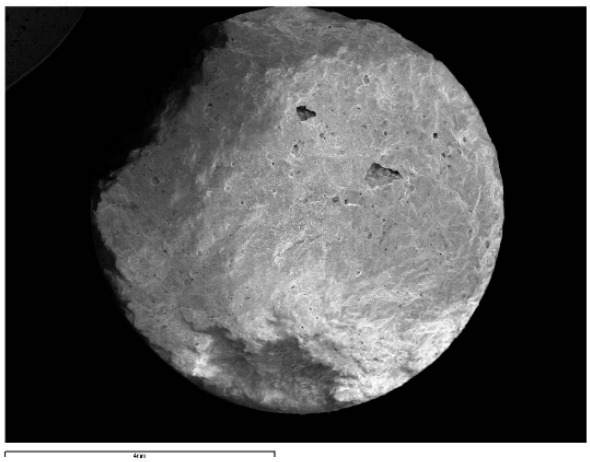
Anexo C Micrografías del fraguado del alfa-TCP y la Serie 5

A la izquierda aparecen las micrografías realizadas al fraguado del α-TCP, mientras que las micrografías de la derecha pertenecen a las realizadas al fraguada de la Serie 5. Los aumentos, a medida que bajamos, son los siguientes: x14, x200, x1000, x2000, x4000, x6000.

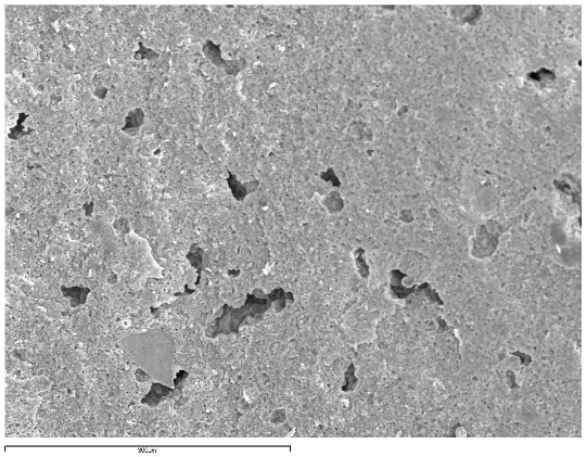
Las *micrografías 13* a *24* representadas a continuación pertenecen a los aumentos realizados a las 2 series.



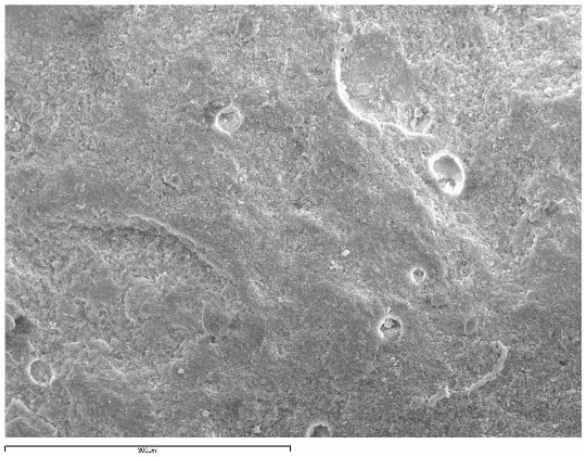
Micrografía 13: α-TCP a x14 aumentos.



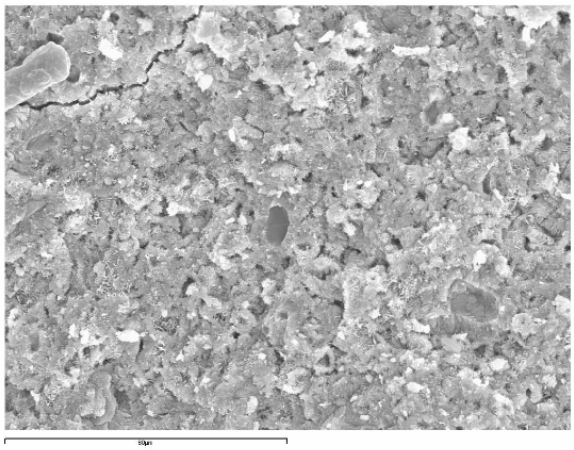
Micrografía 14: Serie 5 a x14 aumentos.



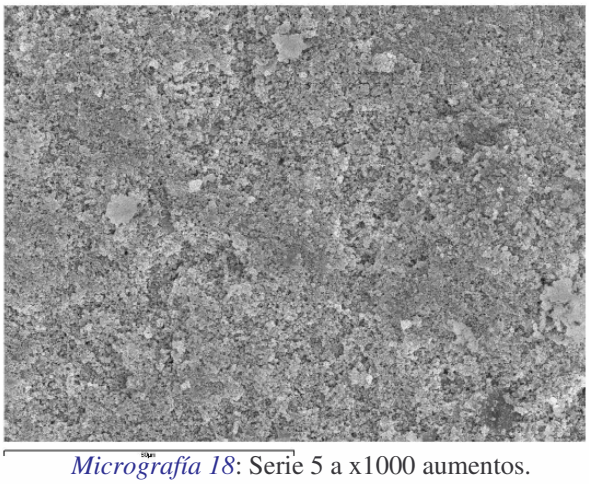
Micrografía 15: α-TCP a x200 aumentos.



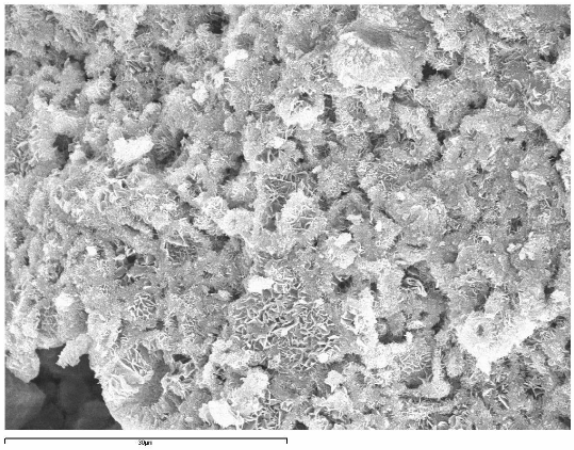
Micrografía 16: Serie 5 a x200 aumentos.



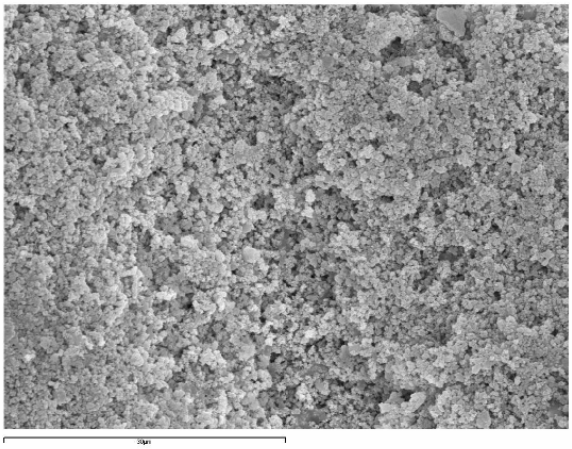
Micrografía 17: α-TCP a x1000 aumentos.



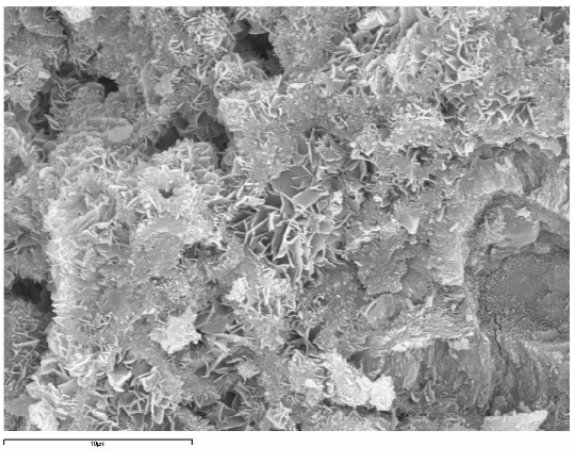
Micrografía 18: Serie 5 a x1000 aumentos.



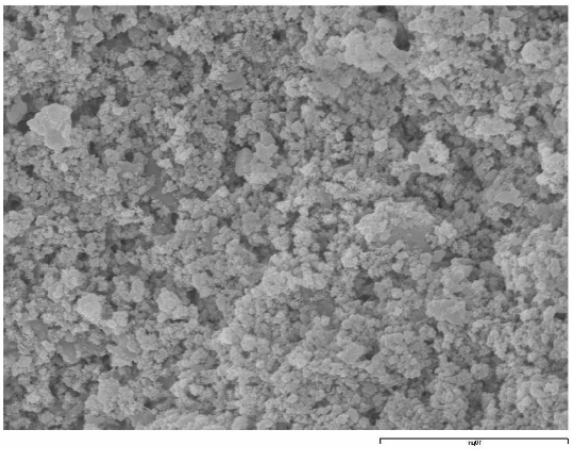
Micrografía 19: α-TCP a x2000 aumentos.



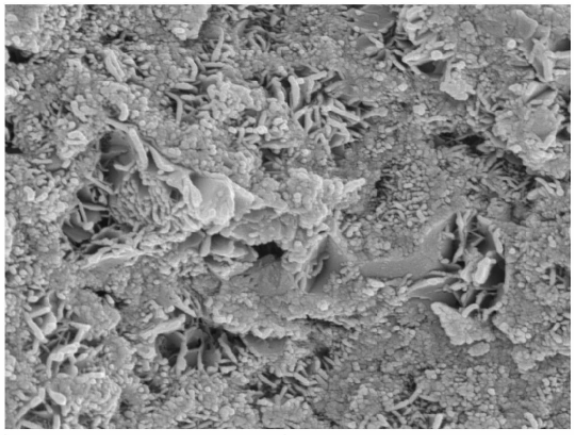
Micrografía 20: Serie 5 a x2000 aumentos.



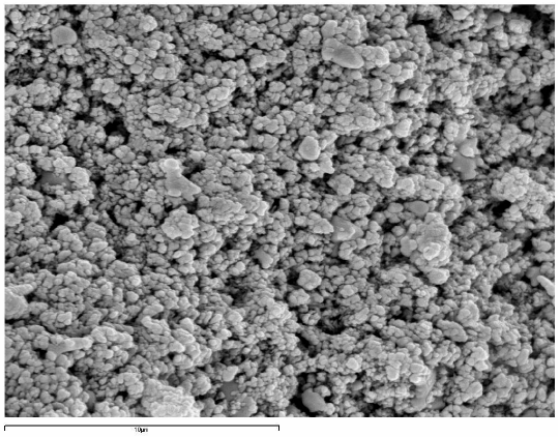
Micrografía 21: α-TCP a x4000 aumentos.



Micrografía 22: Serie 5 a x4000 aumentos.



Micrografía 23: α-TCP a x6000 aumentos.



Micrografía 24: Serie 5 a x6000 aumentos.

Anexo D Ficha técnica Cab-o-Sperse 37/12

CABOT

SAFETY DATA SHEET

According to EC Directive 2001/58/EC

Revision Date: 27/February/2003

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: CAB-O-SPERSE® GP 32/17

Product Code: GP3217

Synonyms: Silicon Dioxide, Synthetic, Crystalline-Free

Use of the Substance/Preparation: Various, Rheological control, Stability

Supplier:

Cabot GmbH
Josef-Bautz-Strasse 15
D-63457 Hanau
GERMANY
Tel: (+49) 6181-505 0
Fax: (+49) 6181-505 201

Cabot Carbon, Ltd.
Sully Moors Road
Sully, Glamorgan CF64 5XP
Wales, UNITED KINGDOM
Tel: (+44) 1446.736999
Fax: (+44) 1446.737123

Cabot Corporation
700 E U.S. Highway 36
Tuscola, IL 61953-9643
UNITED STATES
Tel: 1-217-253-3370
Fax: 1-217-253-4334

Cabot Corporation
157 Concord Road
Billerica, MA 01821
UNITED STATES
Tel: 1-978-670-6959
Fax: 1-978-670-6955

Emergency Telephone Number: US: CHEMTREC 1-800-424-9300 or 1-703-527-3887
US: Other 1-217-253-5595
Canada: CANUTEC 1-613-996-6666
Germany: (+49) 7620 707 545
UK: (+44) 1446-709 641

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	EINECS Number	Weight %	Classification
Silica	7631-86-9	231-545-4	17	None
Water	7732-18-5	231-791-2	83	None

* This substance is also known as Silica, amorphous, fumed, crystalline free, CAS No. 112945-52-5. We are providing both the specific and generic identifications as much of the regulatory information is listed only under the generic classification.

3. HAZARDS IDENTIFICATION

Indication of Danger Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 99/45/EC and their various amendments and adaptations

Principle Routes of Exposure: Inhalation, Eye contact, Skin contact

POTENTIAL HEALTH EFFECTS

Eye Contact: May cause mechanical irritation. Irritating, but will not permanently injure eye tissue. Low hazard for usual industrial or commercial handling.

Skin Contact: May cause skin irritation and/or dermatitis. Repeated exposure may cause skin dryness or cracking.

Inhalation: Dried product may be irritating to respiratory tract. Provide appropriate exhaust ventilation at machinery and at places where dust can be generated. See also Section 8.

Ingestion: Health injuries are not known or expected under normal use. Low hazard for usual industrial or commercial handling.

Carcinogenic Effects: Does not contain any substances listed by IARC (International Agency for Research on Cancer), NTP (National Toxicology Program), OSHA (Occupational Safety and Health Administration), ACGIH (American Conference for Governmental Industrial Hygienists) or EU (European Union). See also Section 11.

Target Organ Effects: Lungs

Medical Conditions Aggravated by Exposure: Asthma, Respiratory disorder

Potential Environmental Effects: No special environmental precautions required.

4. FIRST AID MEASURES

Skin Contact:
Wash thoroughly with soap and water. Seek medical attention if redness, swelling, itching, or burning occurs.

Eye Contact:
Flush eyes immediately with large amounts of water for 15 minutes. Seek medical attention if redness, swelling, itching, burning or visual disturbances occur.

Inhalation:
If cough, shortness of breath or other breathing problems occur, move to fresh air. Seek medical attention if symptoms persist. If necessary, restore normal breathing through standard first aid measures.

Ingestion:
Do not induce vomiting. If conscious, give several glasses of water. Never give anything by mouth to an unconscious person.

Notes to Physician:
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Extinguishing Media:
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special Protective Equipment for Firefighters
Wear suitable protective equipment. In the event of fire, wear self-contained breathing apparatus.

Specific Hazards:
Product resists ignition and does not promote flame spread.

Hazardous Combustion Products:
None

Risk of Dust Explosion:
This material is an inorganic dust dispersed in water, and will not create nor support conditions that would result in a dust explosion or fire.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Avoid formation of dust and aerosols. Ensure adequate ventilation. Use personal protective equipment. See also Section 8.

Methods for Cleaning Up:
Clean up promptly by vacuum. Use a suitable vacuum cleaner. Pick up and transfer to properly labelled containers. See Section 13.

Environmental Precautions:
No special environmental precautions required. Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

Handling:
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Do not breathe aerosols or dust from dried material. Provide appropriate exhaust ventilation at machinery and at places where dust can be generated.

Storage:
DO NOT FREEZE. Keep in properly labelled containers. Keep at ambient temperatures.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS
There are no exposure limits identified for this specific product. Exposure limits for silica are stated below.

Silica 7631-86-9

Austria MAK:	4 mg/m^3, TWA, Inhalable fraction
Belgium OEL:	10 mg/m^3, TWA, Inhalable fraction
	3 mg/m^3, TWA, Respirable fraction
Germany TRGS 900:	4 mg/m^3, TWA, Inhalable fraction
Italy OEL:	10 mg/m^3, TWA, Inhalable fraction
	3 mg/m^3, TWA, Respirable fraction
Netherlands MAC:	10 mg/m^3, TWA, Inhalable fraction
	5 mg/m^3, TWA, Respirable fraction
Norway:	1.5 mg/m^3, TWA, Respirable fraction
Spain:	10 mg/m^3, TWA, Inhalable fraction
	3 mg/m^3, TWA, Respirable fraction
Sweden:	10 mg/m^3, TWA, Inhalable fraction
	5 mg/m^3, TWA, Respirable fraction
UK EH40 OES (Table 2):	6 mg/m^3, TWA, Total inhalable fraction
	2.4 mg/m^3, TWA, Respirable fraction
ACGIH TLV:	10 mg/m^3, TWA. Inhalable fraction

Silica - 7631-86-9

Austria - MAK	4 mg/m^3 Inhalable dust.
Germany - TRGS 900	MAK: 4 mg/m^3 Inhalable fraction.

ENGINEERING CONTROLS
Provide appropriate exhaust ventilation at machinery and at places where dust can be generated. Ensure adequate ventilation to maintain exposures below occupational limits.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Approved respirator may be necessary if local exhaust ventilation is not adequate.

Hand Protection: Repeated exposure may cause skin dryness or cracking. Use protective skin cream before handling the product. Wear suitable gloves.

Eye Protection: Wear eye/face protection: Safety glasses with side-shields, Goggles.

Skin and Body Protection: Wear suitable protective clothing. No special protective equipment required.

Other: Handle in accordance with good industrial hygiene and safety practice. Emergency eyewash and safety shower should be located nearby.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	White Liquid
Odor:	None
pH:	9.0-10.2
Specific Gravity:	9.15-9.30
Boiling Point/Range:	Approximately 100 °C
Melting Point/Range:	Approximately 0 °C
Water Solubility:	Dispersible
Vapor Pressure:	Similar to water
% Volatile (by Volume):	Not determined
Evaporation Rate:	Not determined
Viscosity:	< 200
Partition Coefficient (n-octanol/water):	Not determined
Flash Point:	Not determined
Method:	Not applicable
Flammable Limits in Air - Upper (%):	Not determined
Flammable Limits in Air - Lower (%):	Not determined
Autoignition Temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability: Stable

Hazardous Polymerization: Hazardous polymerization does not occur.

Mechanical Sensitivity (shock): Not sensitive to mechanical impact

Conditions to Avoid:
Do not freeze. Avoid formation of dust and aerosols. Product resists ignition and does not promote flame spread.

Hazardous Decomposition Products:
None

Static Discharge Effects:
Avoid formation of dust and aerosols. Low hazard for usual industrial or commercial handling.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Oral LD50:	LD50/oral/rat = > 5000 mg/kg. Information given is based on data on the components and the toxicology of similar products.
Inhalation LC50:	Due to the product's physical characteristics, no suitable testing procedure is available.
Dermal LD50:	No data is available on the product itself.
Eye Irritation:	Draize score 0.7/110 @ 24 hr. Non-irritating. Information given is based on data on the components and the toxicology of similar products.
Skin Irritation:	0/8. Non-irritating. Information given is based on data on the components and the toxicology of similar products.

CHRONIC TOXICITY

Carcinogenic Effects:
Does not contain any substances listed by IARC (International Agency for Research on Cancer), NTP (National Toxicology Program), OSHA (Occupational Safety and Health Administration), ACGIH (American Conference for Governmental Industrial Hygienists) or EU (European Union).

Mutagenic Effects:
Not mutagenic in AMES Test, unscheduled DNA synthesis, chromosomal aberration in Chinese hamster ovary (CHO) cells, Information given is based on data on the components and the toxicology of similar products.

Reproductive Toxicity:
No data is available on the product itself. According to experience not expected.

Sensitizing Effects:
A delayed contact hypersensitivity study in guinea pigs utilizing the Magnusson and Kligman Maximization technique was performed. No sensitization responses were observed. Information given is based on data on the components and the toxicology of similar products.

Synergistic Materials:
None reasonably foreseeable.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: Fish (Brachydanio rerio) LC50(96 hours) > 10,000 mg/l (Method: OECD 203)
Daphnia magna EC50 (24 hours) > 10,000 mg/l (Method: OECD 202)

Information given is based on data on the components and the toxicology of similar products.

ENVIRONMENTAL FATE

Mobility:	Not expected to migrate.
Bioaccumulation:	According to experience not expected.
Persistence / Degradability:	The methods for determining biodegradability are not applicable to inorganic substances.
Distribution to Environmental Compartments:	Not determined.

13. DISPOSAL CONSIDERATIONS

Can be landfilled or incinerated, when in compliance with local regulations.

14. TRANSPORT INFORMATION

Not classified as dangerous in the meaning of transport regulations

15. REGULATORY INFORMATION

Indication of Danger
Not a hazardous substance or preparation according to EC-directives 67/548/EEC or 99/45/EC and their various amendments and adaptations

International Inventories

All components of this product are listed on or exempt from the following inventories:

YES - European Inventory of Existing Commercial Chemical Substances (EINECS)
YES - Australian Inventory of Chemical Substances (AICS)
YES - Canadian Domestic Substances List (DSL)
YES - Chinese Inventory
YES - Japanese Existing and New Chemical Substances (ENCS)
YES - Korean Existing Chemicals List (KECL)
YES - Philippine Inventory of Chemicals and Chemical Substances (PICCS)
YES - United States Toxic Substances Control Act (TSCA) Inventory

Germany
Water Endangering Class (WGK)
WGK ID No.: Not Listed
WGK Class: Not Listed

Switzerland
Giftklasse (Poison Class)
ID No.: Not Listed
Toxic Category: Not Listed

16. OTHER INFORMATION

Prepared by:	Cabot Corporation - Safety, Health and Environmental Affairs
Revision Date:	27/February/2003
Previous Revision Date:	February/2000
Reason for Revision:	New format

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